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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

ED 065621

TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

CUSTODIAN, School (Any Ind) 381.887

5-275

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EDUCATION & WELFARE
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TM 001 921

U. S. Employment Service
in Cooperation with
Michigan State Employment Service

July 1963

GATB #2454

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

CUSTODIAN, SCHOOL (any ind.) 381.887-020

S-275

Summary

The General Aptitude Test Battery, B-1002B, was administered to a final sample of 87 men employed as Custodian, School (any ind) 381.287 at various public schools in Farmington, Livonia, Warren and Willow Run, Michigan. The criterion consisted of supervisory ratings. On the basis of mean scores, standard deviations, correlations with the criterion job analysis data and their combined selective efficiency, aptitudes V-Verbal Aptitude and M-Manual Dexterity were selected for inclusion in the final test norms.

GATB Norms for Custodian, School (any ind.) 381.887 S-275

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
V	CB-1-J	70	V	Part 4	70
M	CB-1-M CB-1-N	90	M	Part 9 Part 10	85

Effectiveness of Norms

The data in Table IV indicate that only 67 percent of the non-test-selected workers used for this study were good workers; if the workers had been test-selected with the above norms, 76 percent would have been good workers. 33 percent of the non-test-selected workers used for this study were poor workers; if the workers had been test-selected with the above norms, only 24 percent would have been poor workers.

I. Purpose

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Custodian, School (Any Ind.) 331.887

II. Sample

The GATB, B-1002B, was administered during the period June 19, 1962 through December 28, 1962 to 109 male workers employed as Custodian, School in four public school systems in Michigan. The workers in the sample were requested to cooperate in the study by their supervisors and school authorities. Of 109 workers tested, 22 were eliminated from the final sample because of invalid test results. For each participating school system the number of Custodians tested, the number included in the final sample and date of testing are shown below:

School System	Number Tested	Number in Final Sample	Date of Testing
Farmington	19	19	12-27-62
Livonia	64	49	12-15-62
Warren	13	11	6-19-62
Willow Run	13	8	12-28-62
	109	87	

To qualify for employment, applicants should be male; of good moral character; mentally mature; in good physical condition; educated through eighth grade or equivalent; and at least 18 years old, but preferably 21. No experience is required and no tests are used in the selection process. Six months on the job was agreed by Head Custodians to be the minimum training time required to become proficient in the performance of all the job duties of the occupation.

TABLE I

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

N = 87	M	σ	Range	r
Age (years)	44.5	11.0	21-66	.037
Education (years)	10.0	1.8	6-14	-.034
Experience (months)	40.0	37.6	6-280	.112

III. Job Description

Job Title: Custodian, School (any ind.) 381.887-020

Job Summary:

Under the supervision of the Head Custodian, performs a variety of tasks, such as sweeping, mopping, sealing, waxing, and washing in the cleaning, servicing, and care of a school building. Performs minor repair and maintenance tasks involving the school building and its equipment. Is responsible for the safety of the building and its occupants.

Work Performed:

Performs the following duties in connection with the cleaning, servicing and maintenance of a school building and its equipment.

Dusts, sweeps, scrubs, waxes and polishes floors: Sweeps and dusts floors using broom and sweeping compound or oil mop to prevent raising dust. Empties sweepings and contents of wastebaskets into refuse bags or cans mounted on wheeled cart. Pushes cart to truck platform to empty waste into disposal cans. Scrubs and mops floors as needed to supplement sweeping operation. Fills and pushes cart with mop buckets to prescribed areas. Operates wet-and-dry pickup vacuum cleaner. Periodically, waxes floors using applicator tool and operates electric buffing machine to polish floors. Scrubs areas such as lavatories, adding disinfectant (chlorine) to soapy mop water as necessary to assure proper cleaning of surfaces. Replenishes toilet tissue and other dispensers as needed. Cleans building furniture and fixtures: Removes gum or other sticky material from desks, tables and floors using hand scraper. Daily wipes lunchroom tables clean with damp cloth. Periodically cleans and polishes desks, chairs, counters, and other furniture and fixtures using cloth, water, soap feather duster and furniture polish. Washes inside windows using wet sponge and removes moisture from panes with "squeegee" tool. Washes blackboards with damp cloth and dusts erasers.

Replaces defective items such as light bulbs, globes, starters, fuses, window cords, window panes and valve washers using ladders and hand tools such as screw drivers, pliers, and wrenches.

Performs minor maintenance work such as replacing missing bolts and screws in furniture; installing dispensers and pencil sharpeners; tightening door knobs; adjusting window shades; sharpening hand tools; fastening loose trim and molding; cleaning traps; and clearing drains, downspouts, and sumps. Maintains written records and reports. Makes written recommendations to Head Custodian for saving money or time in carrying out duties. Reports malfunction of tools, fixtures, and equipment. Lists manufacturer, serial number, and all available information pertaining to new parts to be ordered for equipment. Tends oil-operated boiler, checking oil pressure and making sure boiler is firing at all times. May reset firing button after preparing boiler for firing. Keeps boiler area clean and free of debris. Removes ash from incinerator; cleans oil line filters and boiler flues; and oils fans, motors, and fittings as needed. Prepares boiler at end of heating season for summer inspection. Orders fuel as needed.

VII. Validity of Norms

The validity of the norms was determined by computing a Phi Coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing 33 percent of the sample in the low criterion group because this percent was considered to be the unsatisfactory or marginal workers.

Table IV shows the relationship between test norms consisting of Aptitudes V and M with critical scores of 70 and 85, respectively, and the dichotomized criterion for Custodian, School 381.887. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE IV

Validity of Test Norms for Custodian, School 381.887
(V-70 and M-85)

N = 87	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	18	40	58
Poor Workers	16	13	29
Total	34	53	87

Phi Coefficient = .23
χ^2 = 4.72
P/2 < .025

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes V and M with minimum scores of 70 and 85, respectively, have been established as B-1002 norms for Custodian, School (any ind.) 381.887. The equivalent B-1001 norms consist of V-70 and M-90.

IX. Determination of Occupational Aptitude Pattern

The data for this study did not meet the requirements for incorporating the occupation studied into any of the 35 OAP's included in Section II of the Guide to the Use of the General Aptitude Test Battery, January 1962. The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.

Checks boiler, valves, and fire extinguishers for safety. Turns off lights and closes and locks doors and windows for economy and security. Operates fire alarm system and/or makes telephone calls to proper authorities in emergencies such as fire, boiler trouble, injury to building occupants, or severe storms. Periodically checks safety and condition of playground equipment. Removes snow or mows grass depending on season of the year.

IV. Experimental Battery

All tests of the GATB, B-1002B, were administered to the sample group.

V. Criterion

The criterion data collected consisted of two sets of independent ratings made by first-line supervisors on a descriptive rating scale designed specifically for this study. The rating scale consisted of eleven items, covering different aspects of job performance, with five alternatives for nine items, four for one item, and three for the remaining item. Weights of one through five, indicating the degree of job proficiency attained, were assigned to the alternatives for the nine items; weights of one through four were assigned to the alternatives for one item; and weights of one through three were assigned to the alternatives for the remaining item. The possible range of total rating scale scores was 11 through 52.

Individuals to be rated by each supervisor were divided into two subsamples; one subsample was rated and rerated on Scale X (item alternatives in random order without numerical values as visual cues) and the other subsample was rated and rerated on Scale Z (item alternatives in ascending order of level of job proficiency with numerical values as visual cues). The ratings were prepared by the head custodians during the period February 6, 1962 through March 26, 1963. The following statistical results were obtained:

1. The reliability coefficients for Scale X and Scale Z were .91 and .89, respectively; the resultant critical ratio of .498 indicates that there is no significant difference between these reliability coefficients.

2. The mean scores for Scale X and Scale Z were 74.0 and 71.5, respectively; the resultant critical ratio of .895 indicates that there is no significant difference between these means.

3. The standard deviations for Scale X and Scale Z were 12.8 and 14.0, respectively; the resultant critical ratio of .618 indicates that there is no significant difference between these standard deviations.

4. Validity coefficients on the relationship between each of the nine aptitudes of the GATB and the total scores on Scale X, and on Scale Z, were computed; resultant critical ratios ranged between -.507 and .787 indicating that there are no significant differences between the validity coefficients obtained on the two scales.

On the basis of the above statistical results, the two subsamples were combined and the final criterion consisted of the combined ratings on Scale X and Scale Z, resulting in a distribution of final criterion scores of 29-99, with a mean of 72.7 and a standard deviation of 13.5.

VI. Qualitative and Quantitative Analyses

A. Qualitative Analysis:

The job analysis indicated that the following aptitudes measured by the GATB appear to be important for this occupation:

Form Perception (P) - required in performing minor repair and maintenance tasks in school building and on equipment.

Manual Dexterity (M) - required in sweeping, mopping, washing, waxing and cleaning.

B. Quantitative Analysis:

TABLE II

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 87

Aptitudes	M	σ	r
G-Intelligence	87.7	16.4	.166
V-Verbal Aptitude	88.5	14.3	.072
N-Numerical Aptitude	84.5	18.4	.194
S-Spatial Aptitude	94.0	18.5	.152
P-Form Perception	81.2	19.4	.123
Q-Clerical Perception	87.6	13.3	.174
K-Motor Coordination	84.8	20.1	.146
F-Finger Dexterity	83.2	19.4	.113
M-Manual Dexterity	92.1	19.6	.119

C. Selection of Test Norms:

TABLE III

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important					X				X
Irrelevant									
Relatively High Mean	X	X		X					X
Relatively Low Sigma		X				X			
Significant Correlation with Criterion									
Aptitudes to be Considered for Trial Norms		V							M

Trial norms consisting of various combinations of Aptitudes V and M with appropriate cutting scores were evaluated against the criterion by means of the Phi Coefficient technique. A comparison of the results showed that B-1002 norms consisting of V-70 and M-85 had the best selective efficiency.